












**PRESERVING OUR  
ROAD AND BRIDGE  
INFRASTRUCTURE**



**2004 ANNUAL REPORT  
TRANSPORTATION ASSET  
MANAGEMENT COUNCIL**

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## **PREFACE**

“The department and each local road agency shall keep accurate and uniform records on all road and bridge work performed and funds expended for the purposes of this section, according to the procedures developed by the council. Each local road agency and the department shall annually report to the council the mileage and condition of the road and bridge system under their jurisdiction and the receipts and disbursements of road and street funds in the manner prescribed by the council, which shall be consistent with any current accounting procedures. An annual report shall be prepared by the staff assigned to the council regarding the results of activities conducted during the preceding year and the expenditure of funds related to the processes and activities identified by the council. The report shall also include an overview of the activities identified for the succeeding year. The council shall submit this report to the state transportation commission, the legislature, and the transportation committees of the house and senate by May 2 of each year.” MCL 247.659a(9)

This report is being submitted to the Michigan Legislature and the State Transportation Commission in accordance with the provisions of MCL 247.659a. The purpose of the report is to inform both bodies of the current condition of Michigan’s federal-aid eligible public roads and bridges and the recent activities of the Transportation Asset Management Council.

## **DEDICATION**

This report is dedicated to former Councilmembers Richard Deuell, Aaron Hopper, and John Kolessar. They served the Council and the citizens of Michigan with dedication and commitment. Their service was greatly appreciated and helped to establish the direction and foundational principles upon which the Council is currently following.

**This report was approved by the Transportation Asset Management Council on April 6, 2005.**

## **INTRODUCTION**

Michigan law defines asset management as “an ongoing process of maintaining, upgrading and operating physical assets cost-effectively, based on a continuous physical inventory and condition assessment.” [MCL 247.659a(1)(a)]

### **An Overview of Asset Management**

Asset management provides a solid foundation which allows transportation professionals to monitor the condition of the system. Further, it helps them plan how to optimize the preservation, improvement, and timely replacement of assets through cost-effective management, programming, and resource allocation decisions.

Asset management involves collecting physical inventory and managing current conditions based on strategic goals and sound investments. It is a continuous, iterative process enabling managers to evaluate various scenarios, determine trade-offs between different actions, and select the best method for achieving specified goals.

While asset management utilizes the outputs of pavement and bridge management systems, it is much more than just another management system with a fancy name. The significant difference is that, in many respects, pavement and bridge management systems are used in a “tactical” manner, to identify specific projects. Asset management is a “strategic” approach that looks at the network as a whole rather than individual projects.

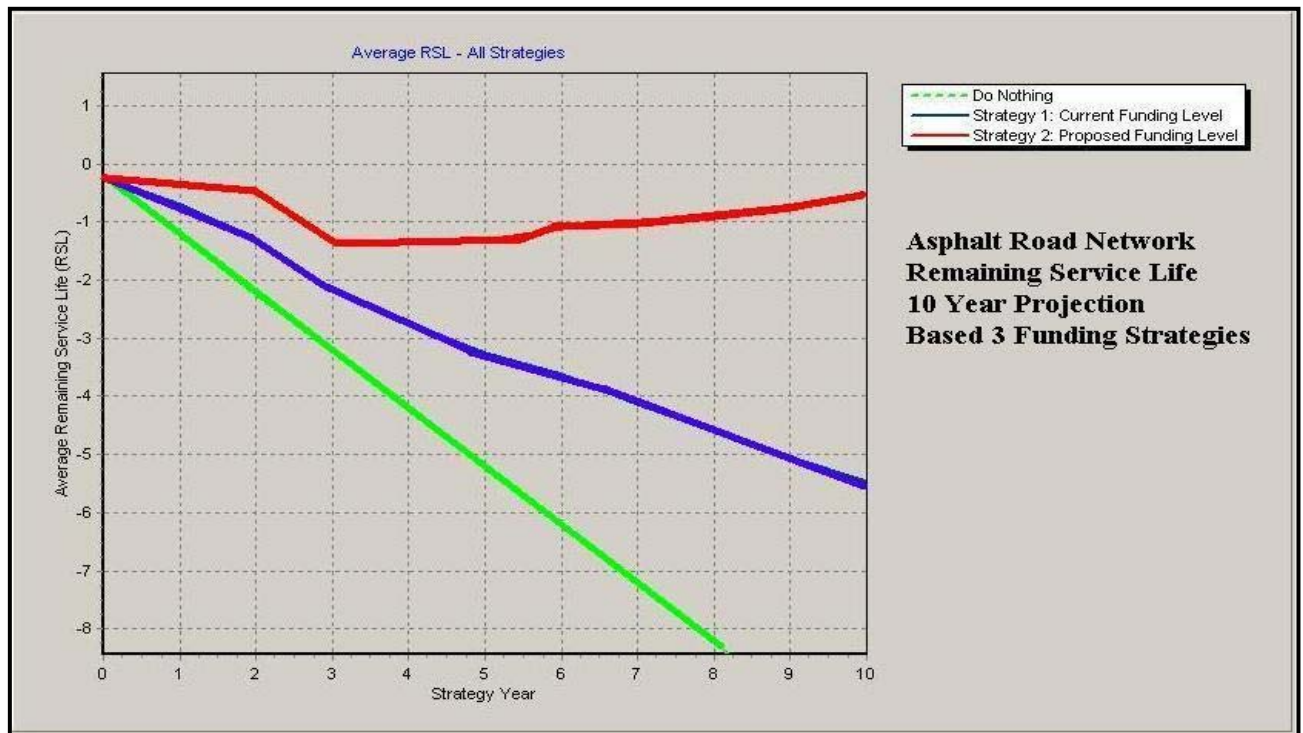
Traditionally, public sector management of roads and bridges has been tactical in nature, concentrating on the immediate and most severe problems. Asset management shifts that thinking to one that is strategic in nature. Decisions are made with regard to the long-range condition of the entire system. This requires considering various investment strategies which will maintain the assets in good condition.

It is crucial in an asset management process to have the ability to forecast future road and bridge conditions and to do investment analyses based on various funding scenarios. The strategic component of the decision-making process entails the ability to assess improvements based on desired outcomes. The strategic focus of an asset management process is supported by network level analysis in addition to the tactical focus of performing location-specific, project-level analysis. This task would include consideration of:

- Current condition of the transportation system and future condition if there is no change in current practices;
- Future condition based on alternative strategies;
- The right time to maintain, preserve, or improve to get maximum useful life from a transportation asset;

- Using preventive fixes or allowing an asset to deteriorate to the point of requiring reconstruction;
- Costs and benefits of each decision; and
- Relationship to identified goals and objectives.

The key is a conscious effort required to create and analyze alternatives. It is necessary to focus attention on effectively and efficiently managing and operating our transportation system, rather than merely reconstructing it. The following graph shows what a typical strategic analysis might look like.



## Elements of Pavement Management

Once a road has been constructed or reconstructed, the condition of the pavement will begin to change over time, due to the effects of weather, environmental factors and traffic loads. Weather factors include the amount of rain/snow, temperatures (particularly extreme heat and cold), humidity, freeze-thaw cycles, exposure to sunlight, etc. Environmental factors include soil types. Traffic load includes some function of traffic frequency and the weight of the vehicles.

There are also combined effects between these two main factors. Heavy and frequent traffic loadings while the pavement is more vulnerable due to severe weather will cause more damage than the same loadings during favorable

weather. In addition, several other factors can contribute to the rate at which pavement deteriorates. These include:

- Type, condition, and moisture content of the sub grade soil,
- Type, thickness, and strength of the base materials,
- Timing of preventive maintenance fixes, and
- Quality of construction.

According to the American Association of State Highway and Transportation Officials (AASHTO): “Those who work with pavements know that after a pavement is built, traffic and environmental loadings create unavoidable stress that will eventually reduce the condition of the roads to a point where they will not be usable without maintenance. They also know that early treatment will extend the life of some pavement.”<sup>1</sup>

Capital Preventive Maintenance (CPM) programs are designed to extend the life of good pavements by applying low cost, short term treatments. CPM projects are low cost projects intended to protect an existing pavement structure, slow the rate of pavement deterioration, and/or correct overall deficiencies in the pavement surface. The benefit of capital preventive maintenance activity can best be realized if an agency applies treatments to a pavement in good condition. CPM treatments cannot be targeted to the worst roads, but must be made to those in fair or good condition which have defects that if left unattended would require much more costly repairs.

The challenge for most agencies is to determine when in the life of a pavement is the best time to apply a capital preventive maintenance treatment for the maximum benefit. CPM is perhaps the single most influential component in the network strategy, which allows an agency to manage pavement conditions. It creates the ability to postpone costly reconstruction or rehabilitation activities, by extending the remaining service life of the original pavement.

A significant benefit of a comprehensive CPM program is that it gives managers control over future network conditions and funding requirements. By controlling future network conditions, decision makers can anticipate routine maintenance work loads, safety deficiencies, and ride quality needs. Several studies have found that a dollar invested in preventive maintenance will save from \$4 to \$6 in future reconstruction or rehabilitation costs. On the other hand, a Federal Highway Administration study found that if you defer preservation for even one year, a road can lose 5 to 6 years of its useful remaining service life.<sup>2</sup>

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<sup>1</sup> Executive Summary Report: Pavement Management Guide,” AASHTO, November 2001, pp. 1-2.

<sup>2</sup> Cited in “Pavement Preservation: Applied Asset Management,” National Center for Pavement Preservation, Department of Civil Engineering, Michigan State University, December 2004.

## **COUNCIL ACTIVITIES**

MCL 247.659a(9) requires the Council to report on “the results of activities conducted during the preceding year and the expenditure of funds related to the processes and activities identified by the council. The report shall also include an overview of the activities identified for the succeeding year.” This chapter contains this required information.

The Council held 11 regular monthly meetings during 2004. They did not meet during the month of December. The Council had a very productive year. The highlights are listed in the accompanying box.

### **2004 HIGHLIGHTS**

1. Completed second year of collecting condition data on the federal-aid eligible system
2. Adopted Goal Statement and four major objectives
3. Adopted Work Program for 2004-2006
4. Published second Annual Report and submitted it to the Michigan Legislature and State Transportation Commission
5. Developed a brochure for distribution to local governments outlining the basic principles of asset management
6. Adopted an Education and Communication plan
7. Sponsored the National Highway Institute Course on Asset Management
8. Developed a process for conducting pilot studies and issued a call for projects for such studies
9. Sponsored a “vendor fair” to review the capabilities of various management systems
10. Conducted a day-long planning session with members of the various Metropolitan Planning Organizations and regional planning agencies

### **Goal Statement and Objectives**

Early in 2004, the Council adopted the following goal statement and associated objectives.

**“The Transportation Asset Management Council will expand the practice of asset management statewide to enhance the productivity of investing in Michigan’s roads and bridges through coordination and collaboration among state and local transportation agencies by:**

1. Surveying and reporting the condition of roads and bridges by functional classification categories for the State and Regional Planning areas,
2. Assessing completed and planned investments in roads and bridges by the various transportation agencies of the state,
3. Supporting the development of appropriate asset management tools and procedures, and
4. Providing education and training on the benefits of developing road improvement programs through the

**use of asset management principles and procedures.  
Our expected outcome is an asset management process that is  
easily used and communicated and leads to a road network that is  
managed by function.”**

The activities that the Council conducted under each of the objectives are described more fully in other areas of this report.

### **2004-2006 Work Program**

Using the Goal Statement and objectives, the Council then developed a comprehensive work program to cover activities over the next several years. The work program covers seven major categories.

- Surveying and reporting road and bridge conditions
- Assessing completed and planned investments
- Supporting asset management tools and procedures
- Provide education and training
- Develop and maintain a spirit of cooperation amongst road agencies
- Management of the transportation asset management program
- Other activities

The complete work program is contained in the Appendix.

### **Expenses**

MCL 247.659a(9) requires the Council to report on their expenditures for the past year. During FY 04, the Council had total expenditures of \$1,008,758 as reported in MDOT's WEBFANCY financial tracking system. The majority of these expenditures were for activities conducted for data collection and training as required by state law.



## **CONDITION OF THE SYSTEM**

One of the most critical concerns raised during the Act 51 Transportation Funding Study Committee's deliberations during 1999-2000, was that there were a myriad of numbers being used to describe the condition of our roads. The Committee stressed the need for policy makers to have one number and one number only. Choosing that number is the job of the Transportation Asset Management Council.

The Council chose to rate the condition of our roads using the **Pavement Surface Evaluation and Rating System (PASER)**. PASER is a visual survey that rates the condition of various types of pavement distress on a scale of 1-10. The Council chose PASER because it is easy to collect; is of sufficient detail for statewide, network-level analyses; and is the method currently used by most road agencies in Michigan.

PASER uses 10 separate ratings with 1 being the worst and 10 being a newly constructed pavement. PASER measures the distress of a pavement's surface. And while it is a subjective method, it is based upon sound engineering principles. Individuals must take a training course before being allowed to rate the roads.

The Council groups the 10 ratings into three categories based upon the type of work that is required for each rating. These categories are routine maintenance, capital preventive maintenance, and structural improvements.

### **Routine Maintenance**

Routine maintenance is the day-to-day, regularly-scheduled activities to prevent water from seeping into the surface such as street sweeping, drainage clearing, gravel shoulder grading, and sealing cracks. PASER ratings 8, 9, and 10 are included in this category. This category also includes roads that are newly constructed or recently seal coated. They require little or no maintenance.

### **Capital Preventive Maintenance**

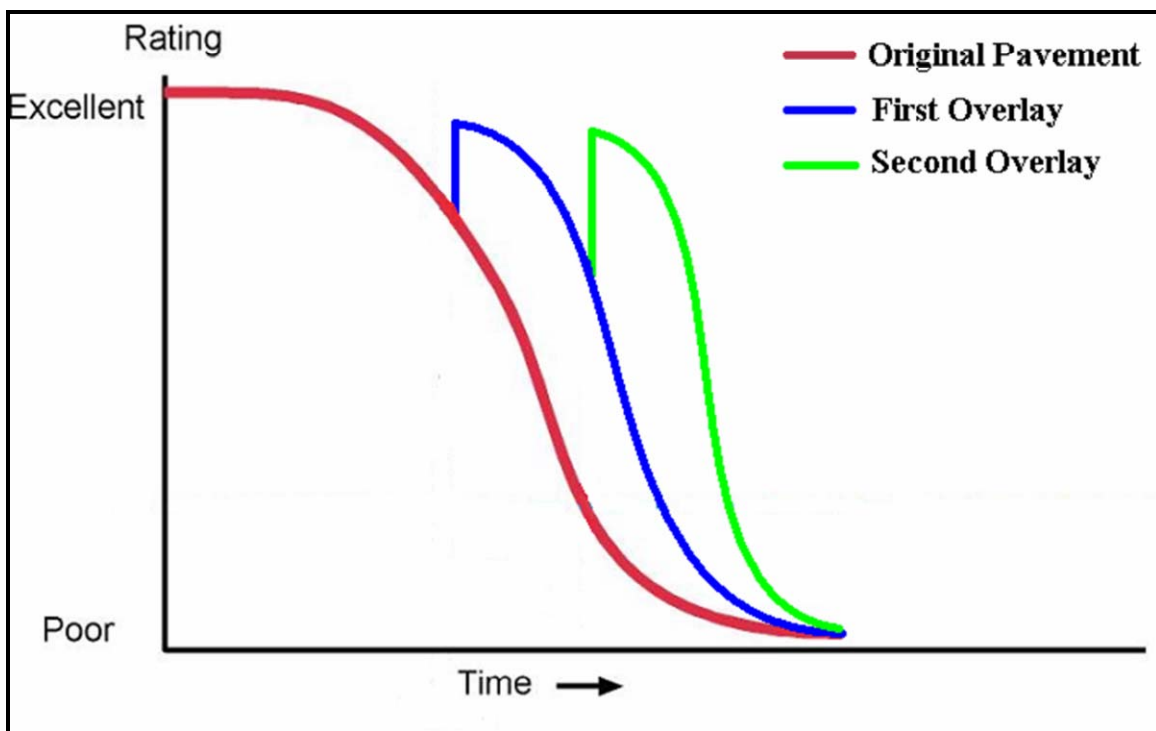
Capital preventive maintenance (CPM) is at the heart of asset management. It is the planned set of cost effective treatments to an existing roadway that retards further deterioration and maintains or improves the functional condition of the system without significantly increasing the structural capacity. The purpose of CPM fixes is to protect the pavement structure; slow the rate of deterioration; and/or correct pavement surface deficiencies. PASER ratings 5, 6, and 7 are included in this category. Roads in this category still show good structural support but the surface is starting to deteriorate.

CPM is intended to address pavement problems **before** the structural integrity of the pavement has been severely impacted.



**Fixes include micro-surfacing, chip seals joint resealing, diamond grinding, crack repairs, minor patching, and seal coating.**

The following graph shows the impact of a typical CPM fix. By doing this type of work you restore the pavement almost to its original condition.



Later on you might do the same treatment (or possibly a different one) and the condition would again be restored. The cumulative effect of a series of treatments would be to postpone, not prevent, reconstruction. Studies have shown that if you invest a dollar today in a CPM fix you can save anywhere from \$4 to \$6 later in more expensive structural improvements.

### **Structural Improvements**

Roads with a PASER rating of 1, 2, 3, or 4 are in need of some type of structural improvement such as resurfacing or major reconstruction. Rutting is beginning to take place, as can be seen in the following picture. Alligator cracking is evident. There are broken concrete slabs that require complete rebuilding.



### **Data Collection Effort**

Transportation asset management is a data intensive process. The ultimate goal of any asset management process is to provide the data and tools for decision-making in both the short-term and the long-term. For any asset management system to work effectively, appropriate data must be collected, stored, and analyzed.

The roadway condition data collection for 2004 was coordinated and collected through the 22 regional planning agencies and metropolitan planning organizations. Each of the planning agencies and MPOs were responsible for initiating and maintaining contacts for training and scheduling with the road agencies in their respective areas.

MDOT and LTAP staff, experienced in data gathering, conducted training sessions around the state. The training consisted of a review of the various PASER ratings; overview of how to use the RoadSoft laptop data collector; and a discussion of “rules of thumb” to use while in the field.

Teams of county, state, city and regional staff worked in cooperation. This was a critical component of the data collection effort. Follow-up reports to the Council indicated that the increased cooperation was one of the positive outcomes about the process.

The teams drove nearly 54,500 miles and rated over 94,000 lane miles of road. In addition to the PASER rating, crews collected information on the type of surface (asphalt, concrete, etc.) and the number of lanes. Vehicles were equipped with a global positioning satellite (GPS) receiver which allowed for accurate locating of information and tactical use of the data by local agencies.

### **2004 Road Condition**

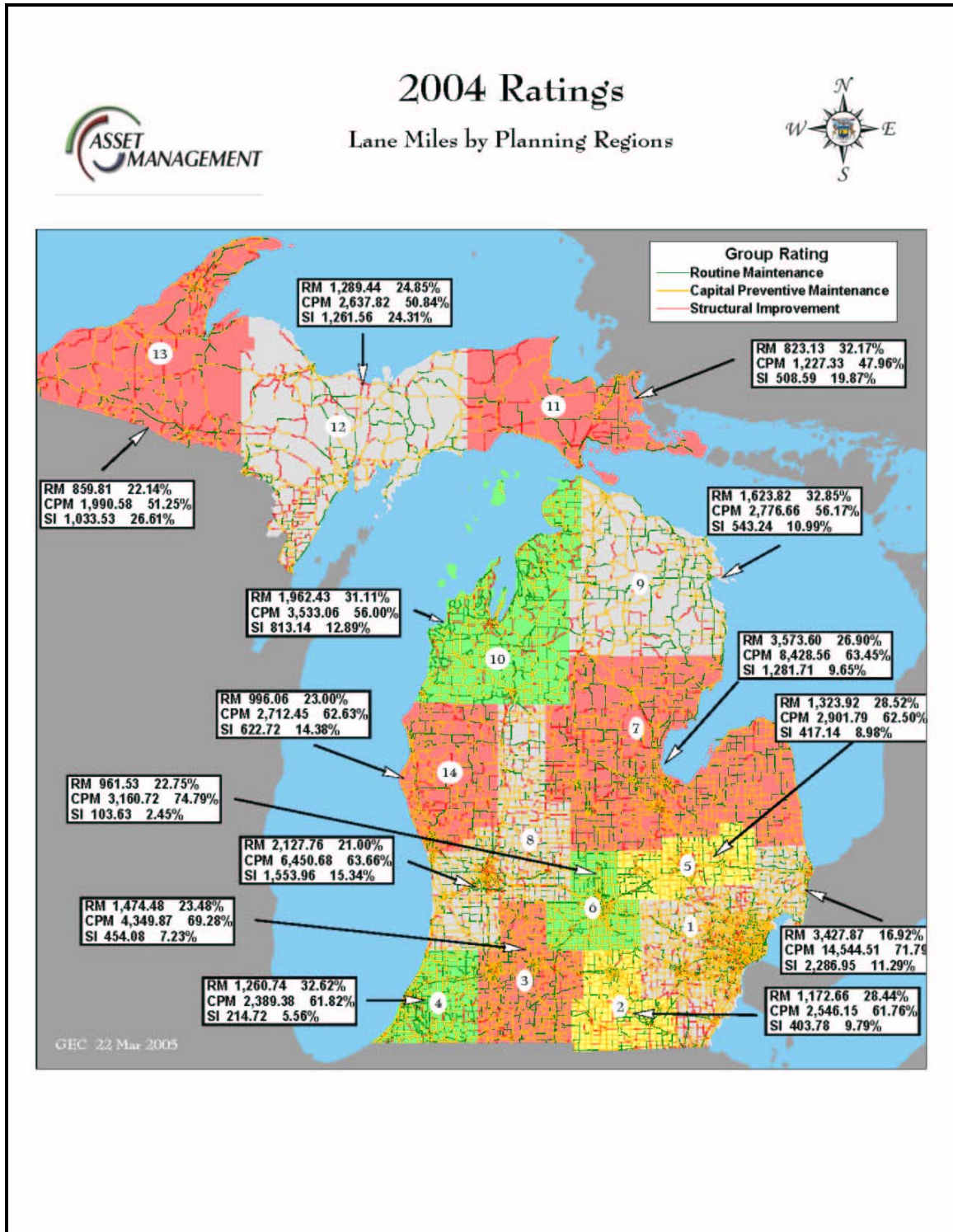
The following data is reported in lane miles. A lane mile is determined by multiplying the number of lanes by the length of the road. For example, if you were surveying 5 miles of a 2 lane road you would be rating 10 lane miles. If it were a 4 lane road then you would have 20 lane miles. So while we rated nearly 43,000 route miles this translated into over 94,000 lane miles.

While the Council collects information on individual segments of road it does not report the individual ratings of that segment of road. The Council uses the data to only report statewide and regional condition totals. Individual ratings of individual segments are reported back to the appropriate jurisdiction for use in the development of local projects. The Council groups the ratings into three “work improvement” categories. These categories are “routine maintenance” (ratings 8, 9, 10), “capital preventive maintenance” (ratings 5, 6, 7), and “structural improvement” (ratings 1, 2, 3, and 4). These categories represent broad areas of work that might be undertaken in order to maintain, preserve, and improve the overall condition of the network. See the Appendix for tables and maps related to the survey.

Overall there were nearly 22,877 lane miles needing routine maintenance; 59,649 lane miles needing capital preventive maintenance; and 11,499 lane miles needing structural improvement. As can be seen in the following table there has been a decrease in the condition of the federal-aid eligible roads from last year.

	<b>2003</b>	<b>2004</b>	<b>DIFFERENCE</b>
<b>Routine Maintenance</b>	<b>34,108</b>	<b>22,877</b>	<b>-11,231</b>
<b>Percent</b>	<b>36%</b>	<b>24%</b>	<b>-33%</b>
<b>Capital Preventive Maintenance</b>	<b>49,626</b>	<b>59,649</b>	<b>10,023</b>
<b>Percent</b>	<b>53%</b>	<b>64%</b>	<b>20%</b>
<b>Structural Improvement</b>	<b>10,076</b>	<b>11,499</b>	<b>1,423</b>
<b>Percent</b>	<b>11%</b>	<b>12%</b>	<b>14%</b>
<b>TOTALS</b>	<b>93,810</b>	<b>94,025</b>	<b>215</b>

The following map shows the breakdown of PASER ratings by regional planning agency areas.



## **Bridges**

Bridges can be classified as “structurally deficient” or “functionally obsolete.” These classifications are determined by the National Bridge Inventory database (NBI). A **structurally deficient** bridge is one in which at least one of the major structural elements (deck, superstructure, or substructure) has a condition rating of poor or worse. A **functionally obsolete** bridge is one that is not structurally deficient, but has deficient roadway width, vertical clearance, waterway, road alignment or load capacity. Federal law requires that bridges be inspected at least once every two years. There are 9 different categories which determine whether a bridge is classified as “deficient.” Condition ratings are based on a 0-9 scale and assigned for the superstructure, the substructure, and the deck of each bridge. A condition of 4 or less classifies the bridge as being “deficient.”

<b><u>CATEGORIES</u></b>	<b><u>NBI CONDITION RATINGS</u></b>
Culvert Condition	9=Excellent
Approach Alignment	8=Very Good
Underclearance	7=Good
Deck Geometry	6=Satisfactory
Waterway Adequacy	5=Fair
Structural Evaluation	4=Poor
Substructure Condition	3=Serious
Superstructure Condition	2=Critical
Deck Condition	1="Imminent" Failure
	0=Failure

**Structurally Deficient:** Generally, a bridge is structurally deficient if any major component is in “poor” condition. If any one or more of the following are true, then the bridge is structurally deficient.

- Deck Rating is less than 5
- Superstructure Rating is less than 5
- Substructure Rating is less than 5
- Culvert Rating is less than 5
- Structural Evaluation is less than 3

**Functionally Obsolete:** Generally, a bridge is functionally obsolete if it is NOT structurally deficient AND its clearances are significantly below current design standards for the volume of traffic being carried on or under. More specifically, if the bridge is NOT structurally deficient AND any one or more of the following are true, then the bridge is functionally obsolete.

- Structural Evaluation = 3
- Deck Geometry is less than 4
- Underclearance is less than 4 and there is another highway under the bridge
- Waterway Adequacy = 3
- Approach Roadway Alignment is less than 4
- Waterway Adequacy is less than 3





A bridge cannot be classified as both structurally deficient and functionally obsolete. If a bridge qualifies for both, then it is reported as structurally deficient. While functionally obsolete bridges represent needed improvements if the overall system is to achieve maximum operating efficiency, the bridges rated as structurally deficient require more immediate attention.

The following table shows the 2004 National Bridge Inventory numbers as compared to the 2003 numbers. As can be seen there has been a slight improvement in the overall condition of the bridges on the arterial system and a decrease in the overall condition of the bridges on the collector system. The reason that the totals do not match is do to the fact that not all of the same bridges are rated every year. In fact, bridges need only be rated at least once every other year.

ARTERIALS	2003	2004	DIFFERENCE
<b>STRUCTURALLY DEFICIENT</b>	680	664	-16
Percent	9%	9%	No Change
<b>FUNCTIONALLY OBSOLETE</b>	603	598	-5
Percent	8%	8%	No Change
<b>GOOD CONDITION</b>	2866	2871	5
Percent	40%	40%	No Change
<b>COLLECTORS</b>			
<b>STRUCTURALLY DEFICIENT</b>	421	447	26
Percent	6%	6%	No Change
<b>FUNCTIONALLY OBSOLETE</b>	367	374	7
Percent	5%	5%	No Change
<b>GOOD CONDITION</b>	2292	2232	-60
Percent	32%	31%	-1%
<b>TOTALS</b>	<b>7229</b>	<b>7186</b>	

## **INVESTMENTS IN THE SYSTEM**

MCL 247.659a(9) requires the Council to report on the “receipts and disbursements of road and street funds.” The language mirrors that in MCL 247.664. This section of Act 51 of the Public Acts of 1951, as amended, requires local road agencies to report to the Michigan Department of Transportation (MDOT) on how they spent their road funds during the previous fiscal year. The use of the same language in MCL 247.659a(9) was deliberate. It was intended that the Council would be able to use the annual financial reports for the Council’s reporting requirements, thus easing the reporting burdens on local agencies.

As reported last year, in reviewing recent Act 51 reports and the forms agencies use to file the required information, it was discovered that the data currently being reported does not allow expenditures to be grouped into various improvement groups. Further, the data reported by city and county agencies is reported differently from the way MDOT reports its expenditures.

The Council needs information related to investments made in the preservation and improvement of pavements and bridges. Further, the Council needs the information in such a manner as to be able to determine total expenditures for routine maintenance, capital preventive maintenance, and structural improvements. This cannot be done with the existing reporting forms.

As indicated in last year’s report the Council would be working during 2004 to correct this situation. The Council began two initiatives that will allow for more accurate reporting of investments in the future. The first effort was to accurately define the reporting categories and to identify what types of pavement fixes fall into each category. Second, the Council is developing an internet-based reporting process.

### **Reporting Categories**

In order for there to be uniformity in reporting there must first be common reporting categories and an understanding of what work activities are included in the categories. The following categories were approved by the Council for use in reporting information in the Annual Report and the Multi-Year Program as required by law. These categories reflect the current definitions in state law. The types of work associated with each category reflect activities as currently identified in the city and county reporting forms and the MDOT work type codes. The full definitions and associated work types are listed in the Appendix.

**Routine Maintenance:** Routine maintenance includes actions performed on a regular or controllable basis or in response to uncontrollable events upon a roadway. Work activities or actions considered to be routine maintenance are those where the benefit or effective service life of the work does not last beyond



the next fiscal year; the work would not significantly change the surface rating of the road; or the work would rarely require acquisition of right-of-way or site specific design.

**Capital Preventive Maintenance:** Capital preventive maintenance means a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserve assets by retarding deterioration and maintaining functional condition without increasing structural capacity. Work activities and actions that are included as a capital preventive maintenance activity are those that extend the life of the asset, but do not change the original design, function, or purpose of the asset. The primary purpose of the work is to repair the incremental effects of weather, age, and use; the useful service life or benefits extend beyond the next fiscal year; and the work may restore some structural capacity of the road but it does not substantially increase the loading allowed.

**Structural Improvement:** Structural improvement includes any activity that is undertaken to preserve or improve the structural integrity of an existing roadway. The structural improvement category includes those activities where the safety or structural elements of the road are improved to satisfy current design requirements. Structural improvement does not include new construction on a new location; a project that increases the capacity of a facility to accommodate that part of traffic having neither an origin nor destination within the local area; widening of a lane width or more; or adding turn lanes of more than ½ mile in length.

**Expand an Existing or New Asset:** This category includes the construction of a new roadway on a new location and/or the addition of lanes to increase the capacity of thru traffic. This category includes any new road that has been constructed that is not in the current inventory, or a new road constructed on a new alignment that replaces an existing facility.

### **Internet-based Reporting Process**

The Michigan Center for Geographic Information (CGI) is in the process of developing an internet-based reporting tool to support the statewide transportation asset management process. The tool is designed for road agencies to collect information regarding planned or completed Capital Preventative Maintenance (CPM) activities on the road system.

The tool allows any road agency to securely login to the application to edit CPM information within their respective jurisdiction. If an agency does not have internet access, authority can be given to another entity (for example, a regional planning commission), to input and maintain CPM information for that jurisdiction.

Three major components are included in the tool. The first is an input screen for recording CPM activities. A standard “mix of fixes” has been identified by

the Asset Management Council and will be included as a beginning pick list. As additional CPM fixes are identified by road agencies around the state they will be added to the tool. The road agencies will have an opportunity to add the unit cost and estimated life expectancy of the pavement treatment. Other characteristics of the road such as number of lanes and pavement width can optionally be added as well.

A second feature of the tool is the map navigation function. The map tool is designed to be like standard internet map tools such as “Map Quest” or “Yahoo Maps”. It allows the user to zoom into the desired road segment or intersection based on road name, jurisdiction, or other marker. Once located, the user can then use the mouse to point and click on the map to identify CPM treatment locations. To further assist the user in identifying CPM locations, topographic maps, road maps with PASER ratings and aerial photographs of the area can be used to complement the standard street map.

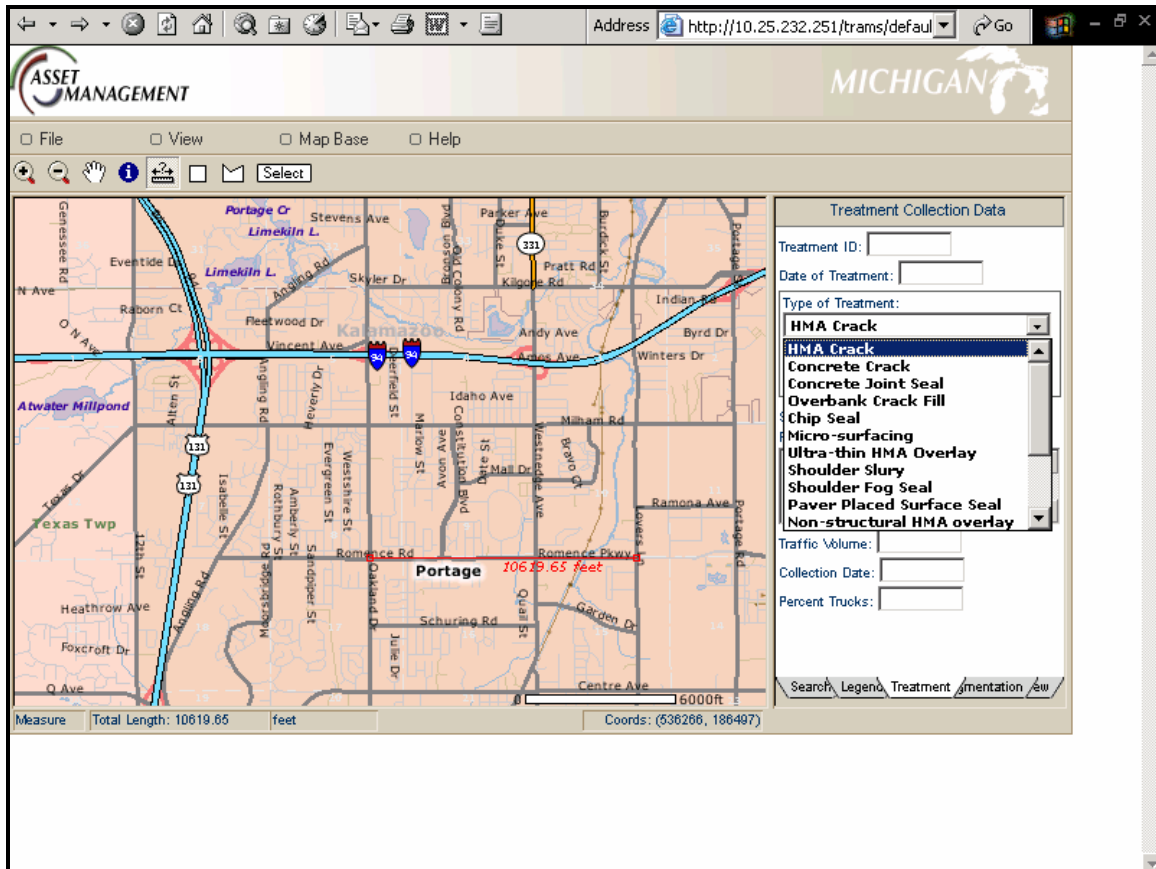
The third feature of the tool is the reporting and mapping component. Standard reports can be generated by date, improvement type, geographic area, and other characteristics. In addition, standard maps can easily be created that thematically show the locations of CPM activities. The user does not have to have GIS experience to create presentation-ready maps and reports of CPM activity.

Finally, the tool is being developed to enable data import and export from other software products. The Council anticipates other road management software products, such as Roadsoft, will be able to utilize information from this tool or submit information to this tool. Software and data standards will need to be developed to facilitate this capability.

Historically, CPM activities have not been regularly tracked by road segment. The importance of this tool is that it gives all local and county road agencies with an internet connection a way to begin collecting this information without much technical or financial commitment. This information is a critical part of the transportation asset management process. It will be used in conjunction with the PASER road rating information to better enable effective asset management at the jurisdiction and statewide levels. The CGI will incorporate CPM data from this tool and others tools such as Roadsoft when compiling information for the Annual Report.

The CGI will be demonstrating the CPM investment collection tool at stakeholder conferences this spring including the County Road Association, Michigan Municipal League, and Metropolitan Planning Region – Michigan Transportation Planning Association conferences. Volunteers will be asked to participate in the testing program through the end of May 2005. The CGI will be requesting comments and feedback on ease-of-use, functionality and performance. A final release will be made available to all local and county road agencies for the summer maintenance activity and will be promoted through the Council’s communications strategies. Educational and training materials will also be developed through the educational program development of the Council.

The Council anticipates future developments with this tool. Some additional capabilities include the addition of Routine Maintenance and Structural Improvement data collection screens. Other mapping and reporting capabilities are also anticipated as the Council attempts to make this tool not only useful to the Council reporting process but also to the road agency's daily business activities.



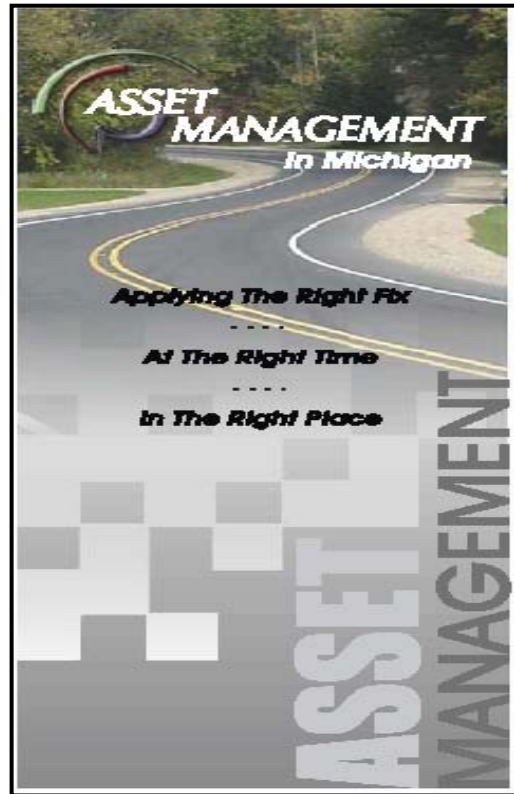
**At this point in time, no information will need to be reported to the Council until the internet-based reporting process is fully developed and operating. The Council anticipates that this will occur later this year and that the first reporting year will be in 2006, covering activities undertaken in 2005.**

## **DEVELOPMENT OF TOOLS AND PROCEDURES**

One of the most critical aspects of the Council's mission, as enumerated in state law, is to recommend the "tools and procedures" that are needed to develop a statewide asset management process. During the last year the Council undertook two key activities in an effort to carry out this mandate.

### **Asset Management Brochure**

In February of last year, the Legislature passed Act 9 of 2004 and the Governor signed the bill into law. One section of the new law allows for cities and villages to transfer more than 25% of their major street funds over to their local street funds if they are using an asset management process. Soon after this law was passed, several villages and cities sought approval to move funds from one account to another. At that time, there was no clearly identified process for doing asset management that communities could turn to for guidance. The Council, working with the Michigan Municipal League, developed a brochure explaining an asset management process.



The brochure lists 6 critical elements to any asset management process. They are:

- Conduct periodic system condition inventories,
- Identify needs by forecasting system conditions based upon reliable rates of deterioration,
- Establish strategic goals and objectives, and performance measures,
- Evaluate investment scenarios based upon forecasted conditions and achievement of goals and objectives,
- Develop and implement a multi-year investment program, and
- Routinely monitor the performance of system improvements.

The brochure has been made available to cities and villages through the Michigan Municipal League. A copy of it is available on the Council's web page at [www.michigan.gov/mdotamc](http://www.michigan.gov/mdotamc). During 2005, Council staff will work with

regional planning agencies to implement asset management processes for any city or village wishing to do so.

### **Vendor Fair**

It is crucial in an asset management process to have the ability to forecast future road conditions and to conduct investment analyses based on various funding scenarios. The strategic component of the decision-making process entails the ability to assess improvements based on desired outcomes. The strategic focus of an asset management process is supported by network level analysis. As identified by the Council this task would include consideration of:

- Using PASER surveyed conditions (past and present) to forecast the condition of road system based upon completed and planned investments.
- Reporting existing and forecasted conditions by functional classification and pavement type by statewide and regional totals.
- Analyzing alternative investment scenarios, both by types of investments and by various levels of investment.
- Comparing forecasted conditions of alternative investment scenarios.
- Producing information in an easy to understand format.

To this end, the Council saw demonstrations of nine models. During 2005, the Council will be making a decision as to which model or models best suits their needs and will begin testing the model outputs.



**Council members listen to a presentation on a strategic model.**



## **EDUCATION AND TRAINING**

Asset management is a relatively new concept when applied to infrastructure management. As a result, it is important to adequately train engineers and planners, elected officials, and the general public as to the value of asset management and how to apply the basic principles of asset management. During 2004, the Council took several steps to begin the process of educating and training those individuals who are responsible for the upkeep of our roads.

In order to accomplish this need, the Council has approved using three different courses. They will include an introductory course on asset management and pavement preservation taught by the Local Technical Assistance Program; an advanced asset management course which will be a re-written version of the National Highway Institute Course on asset management; and an advanced course on pavement preservation taught by the National Center for Pavement Preservation.



### **Local Technical Assistance Program**

The Michigan Local Technical Assistance Program has been offering a day-long overview of asset management and pavement preservation. The course is a good introductory course that covers the basic concepts of asset management and the importance of using a proactive preventive maintenance program. The Council has actively supported attendance at this course by paying for the registration fee for any employee of a local road agency or regional planning agency.

### **National Highway Institute Course on Asset Management**

In April of last year, members of the Council, as well as representatives from county road commissions and city engineering departments, participated in a two-day class on asset management sponsored by the National Highway Institute. The intent of the Council was to determine whether this class could be used throughout Michigan as a means of teaching the basic principles and value of asset management.

Following the course, each participant was asked to opine whether the course could be used in Michigan. The general opinion was that the course provided a good background for asset management but it was geared more toward state departments of transportation rather than local agencies.

Subsequently, the Council discussed the possibility of rewriting the course with the original authors so that it would be oriented toward Michigan's local road agencies. During 2005, the Council is expecting to have the course re-written and once it is completed, will begin using it throughout the state.

### **National Center for Pavement Preservation**

The National Center for Pavement Preservation at Michigan State University offers a two-day advanced course on asset management and pavement preservation. During December of 2004 several members of the Council and staff attended the initial course offering. Following a recommendation from those that attended, the Council has agreed to host this course several times during 2005.

## **CASE STUDY: CITY OF IONIA**

The City of Ionia has undertaken a comprehensive asset management planning process covering most of its infrastructure, including streets, water and sewer lines, and fire hydrants. City Manager Tom Wiczorek provided the following synopsis of their efforts.

During a department planning program in 1998, all department managers for the City agreed that existing mapping systems, record systems, and improvement processes were not working effectively. The big problem? Since 1972, when the last aerial maps were compiled, much of the city had changed both in terms of construction as well as drainage. There was not one location to find maps; rather, one had to search through various departments, records, storage racks, and other locations to find answers to what would otherwise be simple questions.

At the same time, the City's computer system was found to have more than its share of problems. Like most communities, what had been a few computers in isolated departments had later been tied together (somewhat) with a variety of platforms, servers, and programs; not all of which would communicate with each other.

From that meeting came a comprehensive study that outlined how the city would move technology wise for the next five years, with the finished product including a Geographic Information System with linkage of all city data bases on a common framework and across departments. Also from that study, departments embarked on a self-assessment process that would, preferably, end with accreditation of the various city disciplines.

The accreditation models all begin with self-assessment of current operations and, depending on the model, develop a strategic process designed around goals and objectives to provide for continuous improvement. The process manages the assets of the departments in a more effective way, comparing them against national and international objectives and standards, so that a more effective (both cost and quality) organization results. The fire model is probably the most grueling and far-reaching; the APWA model is less onerous but very detailed which is evidenced by the fact only five agencies have been accredited to date.

The State of Michigan, about this time, also embarked on an asset management process for roads, mandating that entities receiving funds would manage the resources as assets – strategically rather than tactically. This was incorporated into the city's process.

The GIS photography took place in 1999-2000 with ortho-digital photos shot to an accuracy of 4 inches using ground coordination methods that included painting water valve boxes, manholes, storm grates, and shut-off valves. All property records were incorporated into the GIS system as well as a new city-wide reappraisal and assessment program. Layers were brought into the system



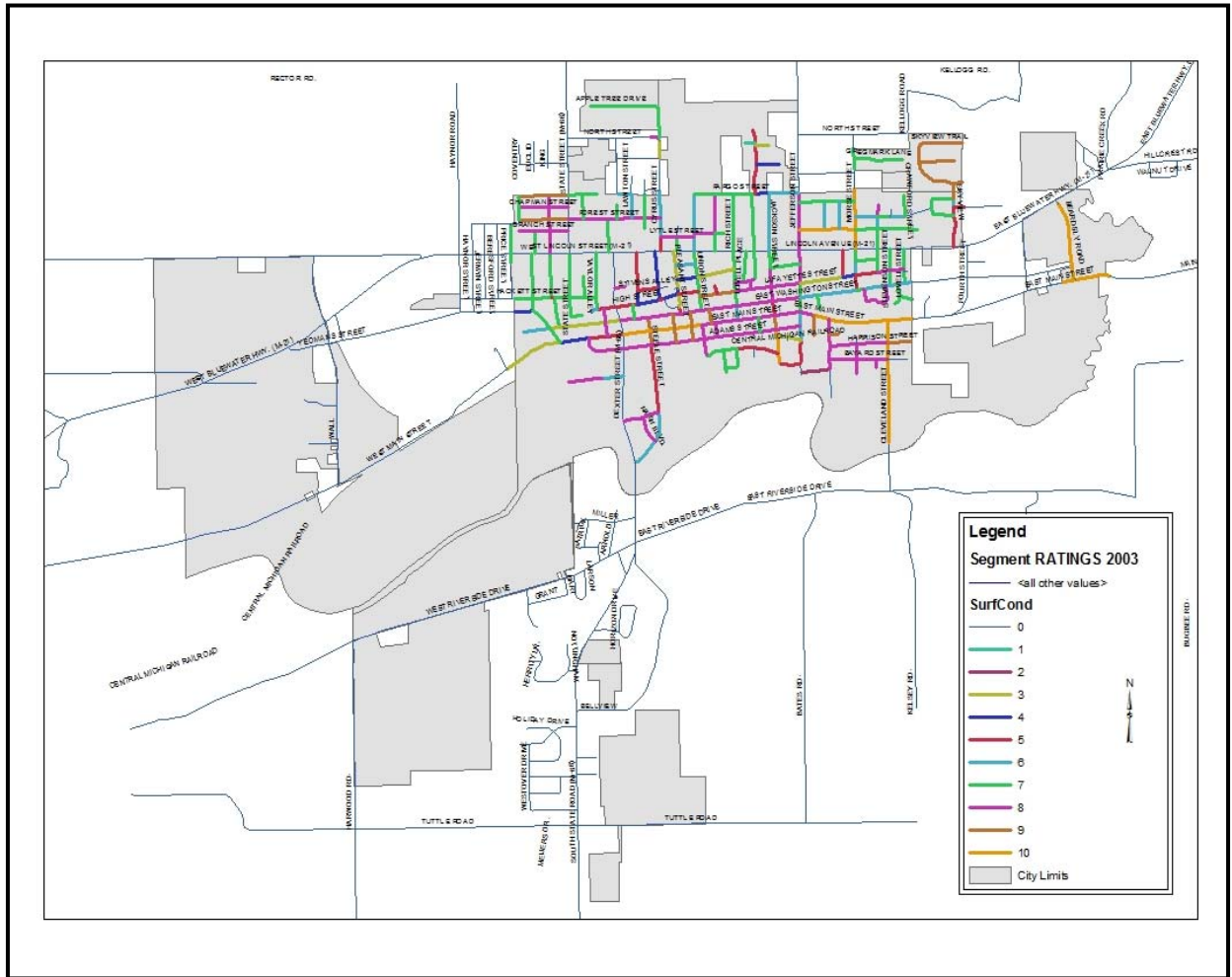
with roads being the first; water, sewer, and storm sewers. Also added have been trees, road signs, street lights, and other items in the road rights-of-way.

Three years ago we first began rating the roadways and ultimately went to RoadSoft and the PASER system. We only trained three people at the start; we are in the process of now training all Public Works and Public Utilities personnel on the RoadSoft, GIS, PASER, and Asset Management.

One of the first things that we noticed was the older water, sewer and areas that had either undersized or no storm sewer also had bad curbs, gutter, and road surfaces. We went underground, videotaping all sewers in 1/3 of the city during 2003. This produced our Asset Management Strategy that would rebuild 1/3 of the city during the 2003-2004 years. We have since videotaped an additional 1/3 to 1/2 of the City which is serving as the basis for a complete rebuild of all of the underground utilities and roadways in the “middle” portion of the City as well as along state highways M-21 and M-66. When complete in 2006, more than 2/3 of the City will have been completely rebuilt. Plans are also taking shape for the 2006-2008 year to complete the underground rebuild which will result in all roadways being in good to excellent condition; all curb and gutter and storm drainage in good to excellent; and all water and sewer being ductile iron and copper leads rather than galvanized and cast iron (all lead pipes and connections have been taken out of the system during the last seven years).

Also this year, all sidewalks will be incorporated into the Asset Management System. The City completed more than \$1 million in sidewalk repairs and upgrades in 2004 and the system will be maintained using the PASER concrete programs as well as GIS data. Lastly, the City’s parks and river trail system is being rated for the first time (including the Ionia Fairgrounds that is a city park) with those assets planned for improvements on a long-term approach.

The 2005 goals include training all staff in the concepts of AM, GIS, and PASER while also adding a new 800 MHz radio system, vehicle tracking, and GPS positioning on trucks and equipment. This radio system is operational; the radios should be installed by June of 2005; and the AVL and other portions during the summer months. The AVL is currently used and has been debugged by the City’s Dial-A-Ride bus system and has shown that times for transport have been reduced by as much as 7 minutes in many cases.



## **APPENDIX**

## **TRANSPORTATION ASSET MANAGEMENT COUNCIL**

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**TRANSPORTATION ASSET MANAGEMENT COUNCIL**  
**WORK PROGRAM**  
**May 2004-May 2006**

Approved by the State Transportation Commission, April 29, 2004

**I. SURVEYING AND REPORTING ROAD & BRIDGE CONDITIONS**

**A. Conduct an annual pavement condition rating using the PASER methodology on the federal-aid eligible system for at least two more years. (In process; complete by January 2006)**

- A1. Determine data to be collected
- A2. Determine software to be used
- A3. Develop training program
- A4. Conduct training sessions
- A5. Determine data collection schedule
- A6. Conduct data collection activities
- A7. Review and test data for accuracy
- A8. Report data to TAMC staff
- A9. Staff review and analysis of data
- A10. Preliminary presentation to TAMC
- A11. Verification of data
- A12. Presentation of results to State Transportation Commission (STC)
- A13. Return data to local agencies by February 1.
- A14. Prepare summary report to TAMC
- A15. Review previous year's activities and modify as needed

**B. Investigate and demonstrate other road rating methods, including those being used by various transportation agencies in Michigan. Compare the cost, efficiency, and reliability of those methods to PASER. Determine if equivalency tables can be used to report consistent ratings across the state. (Complete by January 2006)**

- B1. Data Management Committee determines scope of study
- B2. RFP drafted and presented to committee for review
- B3. TAMC reviews and approves RFP
- B4. RFP advertised
- B5. Proposals reviewed by staff and recommendation to Data Management Committee
- B6. TAMC approves proposal and requests approval from STC
- B7. Draft contract and submit for approval to Commission Audit, Attorney General, Finance
- B8. Need Ad Board approval (if for more than \$25,000)
- B9. Contract awarded
- B10. Contract administered, including monthly updates to committee
- B11. Contract completed

**C. Assess the current method of rating and managing bridges in comparison to other potential methodologies. (Complete by July 2005)**

- C1. Review and report to committees various methods of rating and managing bridges.

- C2. Committees recommend method of rating and managing bridges to the Transportation Asset Management Council
- C3. Council determines method to be used for reporting bridge condition.
- D. Demonstrate the cost and efficiency of conducting road and bridge condition ratings on the non-federal aid eligible system. Studies should include demonstrating the use of PASER and other available rating methods and should also address the procedures and reliability of sampling. (Start July 2004; complete by January 2006)**
  - D1. Data Management Committee determines scope of study and process to be used [pilot studies or as part of normal MPO/RPA activities] [This should include data to be collected, data rules to be followed, reporting requirements, etc.]
  - D2. Develop draft study proposal for review by committee
  - D3. [If the decision is to contract out the work then use same RFP process as indicated above.]
  - D4. Begin testing

## **II. ASSESSING COMPLETED AND PLANNED INVESTMENTS**

- A. Identify and define the data elements necessary to determine annual investments in roads and bridges for all road agencies. Data items should be identified that are required for statewide reporting as well as those that are required for implementation of baseline tools and procedures at the individual agency level. (Complete by September 2004)**
  - A1. Staff reviews common data requirements in current models used by agencies in Michigan and report to Data Management and Strategic Analysis Committees. This should include information by improvement category.
  - A2. Committees review report and select data that should be included for statewide analysis
  - A3. Committees review report and select data that should be included for local analysis
  - A4. Data for local analysis submitted to local agencies for review and refinement, if necessary
  - A5. TAMC finalizes data elements
- B. Establish procedures and collect data necessary to determine annual investment levels in roads and bridges consistent with the requirements of the data model used for annual reporting to the State Transportation Commission. (Begin for federal-aid eligible system September 2004; begin for entire road system September 2005)**
- C. Determine the procedures necessary to identify the cost, type, and location/extent of planned 3-year road and bridge improvements. (Complete by September 2004)**

### **III. SUPPORTING ASSET MANAGEMENT TOOLS & PROCEDURES**

- A. Adopt a statement that defines the principles of asset management for Michigan's roads and bridges. This should address the basic procedures that will be followed by the TAMC in reporting to the State Transportation Commission as well as basic**
- B. procedures that are recommended for individual road agencies to follow. (Complete by July 2004)**

- A1. Identify the key components/activities of an asset management process
- A2. Develop a list of key activities based upon most recent research
- A3. Review various tools currently being used for asset management and identify those which are cost effective and efficient for use by local, regional, and state agencies.
- A4. Identify a variety of software that an individual agency could utilize to conduct an asset management process
- A5. Set a target for the percentage of road agencies utilizing an asset management process by a given date

- B. Select a computer model capable of forecasting future system conditions on Michigan's roads and bridges based upon surveyed conditions and reported improvements. The model must be capable of testing various scenarios for improvement type and levels of investment. (Complete by January 2005)**

- B1. Staff presents information and data requirements on current models to the Strategic Analysis Committee.
- B2. Strategic Analysis Committee selects models to test.
- B3. Testing of models and review of results by Strategic Analysis Committee.
- B4. Strategic Analysis Committee makes recommendation to Transportation Asset Management Council.
- B5. TAMC selects model

- C. Support the development of a baseline "best practice" procedure designed to assist individual road agencies with development of annual and multi-year road and bridge improvement programs that incorporates the principles of asset management by the TAMC. (Complete by January 2005)**

- C1. Investigate other available tools and procedures that are consistent with the principles of asset management identified by the TAMC.
- C2. Review survey completed last year for appropriate information regarding this work item.
- C3. Document tools and procedures currently being implemented by various road agencies in Michigan.
- C4. Review information with local agencies for input and revision, as necessary.

- D. Demonstrate the use of asset management principles and procedures for developing road and bridge improvement programs including effective and innovative methods to involve citizens and elected/appointed officials. (Start July 2004; complete by January 2006)**

- D1. Highlight local success stories and procedures through Annual Report and regional newsletters.



- D2. Review national publications and share appropriate information and stories with regional planning agencies and MPOs for dissemination to local and state road agencies.

#### **IV. PROVIDE EDUCATION & TRAINING**

##### **A. Develop an annual education and training program in coordination with the state's MPOs/RPAs on the following:**

1. **Pavement condition survey procedures (beginning with PASER)**
2. **Data requirements and reporting procedures for completed and planned (3-year) road and bridge improvements**
3. **Benefits of asset management with instructions on the procedures for developing multi-year road improvement programs** (Complete by January 2005)

- A1. Test NHI Course on Asset Management for applicability of being used at the local level
- A2. Conduct training seminars/conferences on asset management
- A3. Investigate the possibility of working through the Local Technical Assistance Program (LTAP) for training activities.

##### **B. Establish the state's MPOs/RPAs as the resource/support agencies for condition surveys, collection of investment information, and assistance to local transportation agencies to develop multi-year program using the principles and procedures of asset management. (On-going)**

- B1. Administrative & Education Committee identifies specific activities to be undertaken by the MPOs/RPAs
- B2. Staff reviews activities with MAR and 3C Board of Directors and reports to committee, committee modifies as needed
- B3. TAMC approves committee recommendation
- B4. Staff includes adopted activities in Unified Work Program
- B5. Staff monitors completion of work items and reports to committee
- B6. Administrative & Education Committee reviews and modifies as necessary

##### **C. Provide timely materials and information to key stakeholder groups and local road agencies. (On-going)**

- C1. Maintain web site
- C2. Provide quarterly reports on TAMC activities
- C3. Develop or purchase video on asset management

##### **D. Establish a process for developing and selecting pilot projects that will assist the TAMC in achieving its goals and objectives. (Complete selection process by July 2004; issue a call for projects September 2004; on-going)**

- D1. Submit draft proposal to Administrative & Education Committee
- D2. Submit to TAMC for approval
- D3. Issue a call for proposals
- D4. Review proposals received

- D5. Submit recommended proposals to appropriate TAMC committee
- D6. Submit recommended proposals to TAMC for approval
- D7. Set up contracts with agencies

**V. DEVELOP AND MAINTAIN A SPIRIT OF COOPERATION AMONGST ROAD AGENCIES**

**A. Maintain ongoing communication with the State Transportation Commission and key stakeholder groups. (On-going)**

- A1. Develop a quarterly report on TAMC activities
- A2. Establish “liaison” with Asset Management Action Team
- A3. Meet at least once a year with the directors of the groups represented on the TAMC

**B. Conduct studies and data collection efforts through coordination and collaboration among state and local road agencies. (Complete by January 2006)**

- B1. Conduct data collection in teams of state, city, county and regional personnel
- B2. Submit data and reporting requirements for review to a group of local agency individuals
- B3. Determine and test key asset management elements such as:
  - 1. Deterioration rates
  - 2. Average cost of specific fixes
  - 3. Fix lives and optimum times to apply a particular fix

**C. Provide an asset management presence at annual conferences of the MML, CRAM, MAR/3C, APWA, MAC, MTA. (On-going)**

- C1. Develop standardized presentation that can be used at each conference
- C2. Establish a TAMC Speakers Bureau
- C3. Attend conferences.

**VI. MANAGEMENT OF THE TRANSPORTATION ASSET MANAGEMENT PROGRAM**

**A. Adopt the content and format for the Annual Report to the State Transportation Commission and Legislature. Consideration should be given to the following elements:**

- Existing condition of roads and bridges by functional classification categories (state and sub-regions)
- Existing and planned investments in roads and bridges (“
- Projected condition of roads and bridges based upon current funding levels and planned investments (“
- Analysis of alternative investments and funding level classification (“
- Recommended system condition goals by functional classification categories (“
- Recommended best practice tools and procedures that advance the principles of asset management adopted by the TAMC.

- **Description of the TAMC program for education and training in asset management to the various transportation agencies of Michigan.** (Complete by April of each year.)

- A1. Submit draft outline to Administrative & Education Committee for review
- A2. Submit draft outline to TAMC for approval
- A3. Submit draft report to TAMC for review and approval
- A4. Revise as necessary and resubmit for approval
- A5. Submit to STC and Legislature (by May 2)

**B. Staff will manage the on-going activities of the TAMC in a manner that is technically sound, objective, cooperative, open, and simple to communicate.** (On-going)

- B1. Provide agendas, materials, and minutes in a timely manner
- B2. Provide monthly report to members and STC
- B3. Manage contracts established by the TAMC
- B4. Attend committee and council meetings, and other meetings as requested by members

**C. Develop annual budget.** (Complete by August of each year)

- C1. Develop draft budget and submit to Administrative & Education Committee for review
- C2. Submit draft budget to TAMC for approval
- C3. Submit approved draft budget to STC for approval
- C4. Submit approved budget to MDOT Finance for inclusion in department budget

**D. Establish the Center for Geographic Information as the central data agency required by Act 499 of 2002.** (On-going)

- D1. Develop list of activities/work items to be undertaken by CGI
- D2. Set up contractual arrangements with Michigan Dept. of Information Technology.
- D3. Data Management Committee issues specific work orders
- D4. Data Management Committee reviews billings and authorizes payments
- D5. Data Management Committee/TAMC receives and review monthly progress reports from CGI

**VII. OTHER ACTIVITIES**

**A. Consider establishing the Technical Advisory Panel as permitted by Act 499 of 2002.** (Complete by October 2004)

- A1. Staff prepares report to TAMC on possible activities for the Technical Advisory Panel
- A2. TAMC considers possible activities of the Technical Advisory Panel.
- A3. TAMC determines activity and membership
- A4. Chairman contacts agencies and requests agency to name a representative
- A5. Upon receiving list of representatives Chairman calls first meeting

- B. Maintain liaison with state and national organizations involved in asset management.** (On-going)
  - B1. Establish liaison with Asset Management Action Team
  - B2. Participate in state and national conferences
- C. Establish set of performance measures for use in asset management.** (Complete by January 2006)
- D. Determine means of educating public and elected officials on transportation funding.**
- E. Review current definition of “maintenance.”** (Complete by September 2004)
  - E1. Review current definition of maintenance with TAMC.

## **2005 Reporting Categories: Definitions & Work Types**

The following definitions and work types were approved by the Asset Management Council for use in reporting information in the Annual Report and the Multi-Year Program required by law. These definitions reflect the current definitions in Act 51. The work types reflect activities as currently identified in the city and county Act 51 reporting requirements and the MDOT work type codes. These definitions and work types may be modified in the future to reflect actual practices and current construction specifications.

**At this point in time, no information will need to be reported to the Council until the internet-based reporting process is developed and operating.** The Council anticipates that this will occur later this year and that the first reporting year will be in 2006...covering 2005 activities.

**Routine Maintenance:** Routine maintenance includes actions performed on a regular or controllable basis or in response to uncontrollable events upon a roadway. Work activities or actions considered to be routine maintenance are those where the benefit or effective service life of the work does not last beyond the next fiscal year; the work would not significantly change the surface rating of the road; or the work would rarely require acquisition of right-of-way or site specific design. Work activities considered to be routine maintenance include, but are not limited to:

- Placing new aggregate on an existing gravel or stone surface to replace original material worn off
- Patching and repairing roadway surface of bituminous, concrete, or brick
- Snow and ice removal
- Grading a gravel road
- Cleaning streets and associated drainage
- Unplugging drain facilities
- Mowing roadside
- Control of roadside brush and vegetation
- Reconditioning of bituminous surfaces of any length section by scarifying when new material is added which increases the existing bituminous surface with less than  $\frac{3}{4}$  inch
- Dust layers, sprinkling, and flushing
- Repairing storm damage
- Emergency management of road closures that result from uncontrollable events

**Capital Preventive Maintenance:** Capital preventive maintenance means a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserve assets by retarding

deterioration and maintaining functional condition without increasing structural capacity. Work activities and actions that are included as a capital preventive maintenance activity are those that extend the life of the asset, but do not change the original design, function, or purpose of the asset; the primary purpose of the work is to repair the incremental effects of weather, age, and use; the useful service life or benefits extend beyond the next fiscal year; and the work may restore some structural capacity of the road or but it does not substantially increase the loading allowed. Work activities in this category include but are not limited to:

- Pavement crack sealing
- Micro-surfacing
- Chip sealing
- Concrete joint resealing and crack sealing
- Concrete joint repair and surface spall repair
- Filling shallow pavement cracks
- Patching concrete
- Shoulder resurfacing
- Concrete diamond grinding
- Dowel bar retrofit
- Bituminous overlays of 1 and ½ inches or less
- Restoration of drainage
- Overband crack filling
- Surface milling & non-structural overlays
- Bituminous shoulder ribbons
- Ultra-thin overlay
- Full depth concrete pavement repairs
- Partial depth concrete pavement repairs
- Cape seal, slurry seal, fog seal
- Cold milling
- Hot-in-place bituminous recycling
- Skip patching
- Profile milling
- Concrete pavement restoration
- Underdrain outlet repair and cleaning
- Surfacing of shoulders with materials of higher quality than adjacent roadsides
- Extending old culverts and rebuilding headwalls

**Structural Improvement:** Structural improvement includes any activity that is undertaken to preserve or improve the structural integrity of an existing roadway. The structural improvement category includes those work activities where the safety or structural elements of the road are improved to satisfy current design requirements. Structural improvement does not include new construction on a new location of a roadway; a project that increases the capacity of a facility to accommodate that part of traffic having neither an origin nor

destination within the local area; widening of a lane width or more; or adding turn lanes of more than ½ mile in length. Structural improvement activities include, but are not limited to:

- **Reconstruction:** Any construction where the road is totally reconstructed by reditching, new subgrade, subbase, and surface at the same location.
- **Resurfacing:** Resurfacing pavements with minor base repair, minor widening, and resurfacing the existing width. The thickness would be more than 1 and ½ inches.
- **Rehabilitation:** These fixes include two or three courses of hot mix asphalt overlays, concrete patching and diamond grinding, crush and shape with bituminous overlay, rubblize and multiple course HMA overlay, and unbonded concrete overlays.
- **Gravel Surfacing:** Placing 3 inches or more of new aggregate on an existing stone or aggregate surface.
- **Paving Gravel Road:** All costs expended to place a hard surface on an existing gravel road.
- **Rebuilding short sections of roadway** to super-elevate curves, to improve grades, to lengthen horizontal curves, and to improve sight distances.
- **Adding auxiliary turning lanes or passing lanes** of more than ½ mile in length.
- **Replace culverts**

**Expand an Existing or New Asset:** This category includes the construction of a new roadway on a new location, and/or the addition of lanes to increase the capacity for thru traffic. This category includes any new road that has been constructed that is not in the current inventory, or a new road constructed on a new alignment that replaces an existing facility. Work activities in this category include but are not limited to:

- Installation of new culverts, wash checks, baffles, drains, sewers, and catch basins on old or new roads or streets
- Adding a lane to an existing road of more than ½ mile long
- Reconstruct and add lane(s) over ½ mile long
- Interchange redesign and upgrading Relocate an existing route
- Construct new roadway in a new location
- Construct a new interchange

**Retiring an Asset:** In this category the following activities would be included but not limited to:

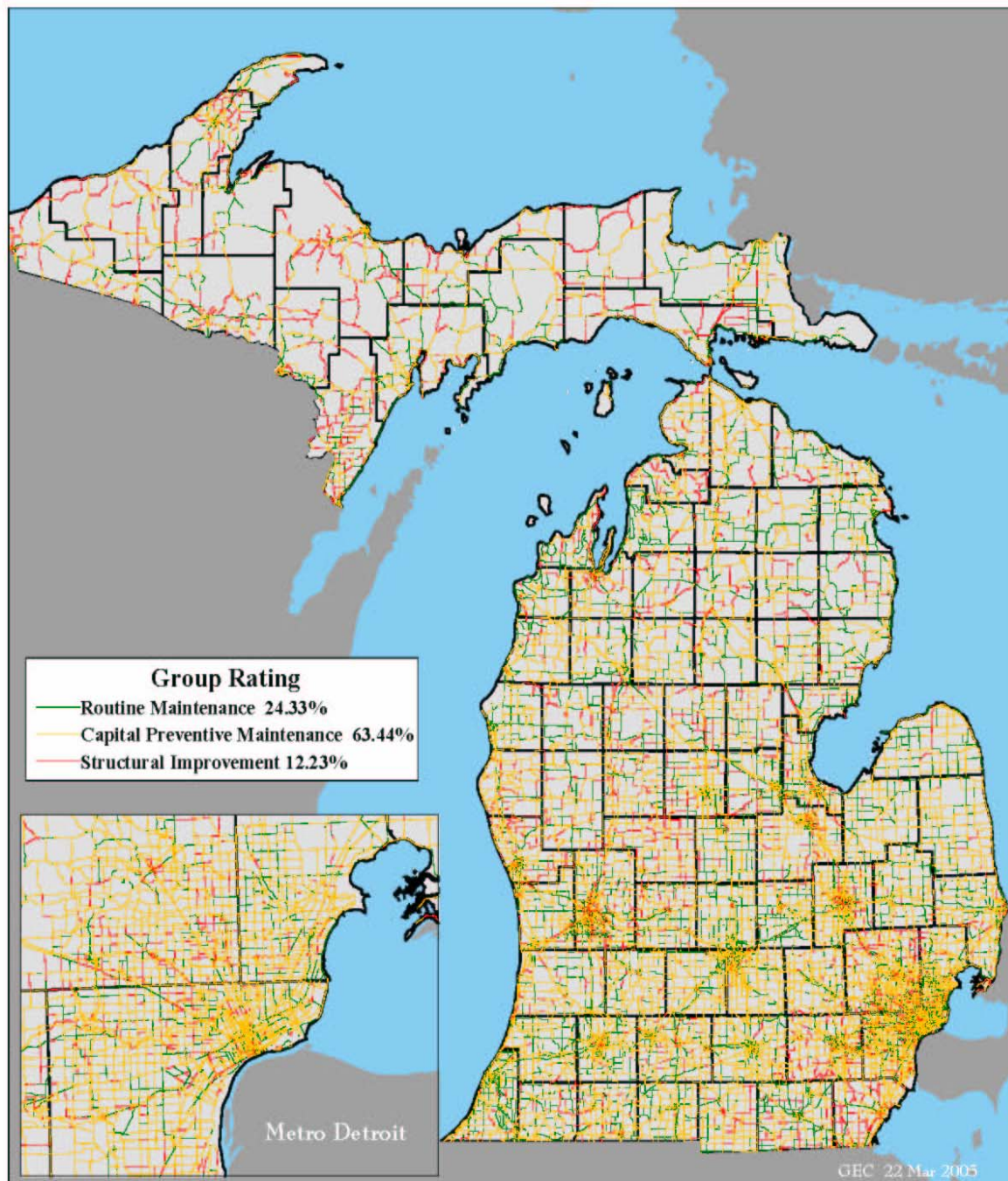
- Closing, abandoning or converting to private use a public road
- Selling a roadway to an authority or other non-Act 51 government agency





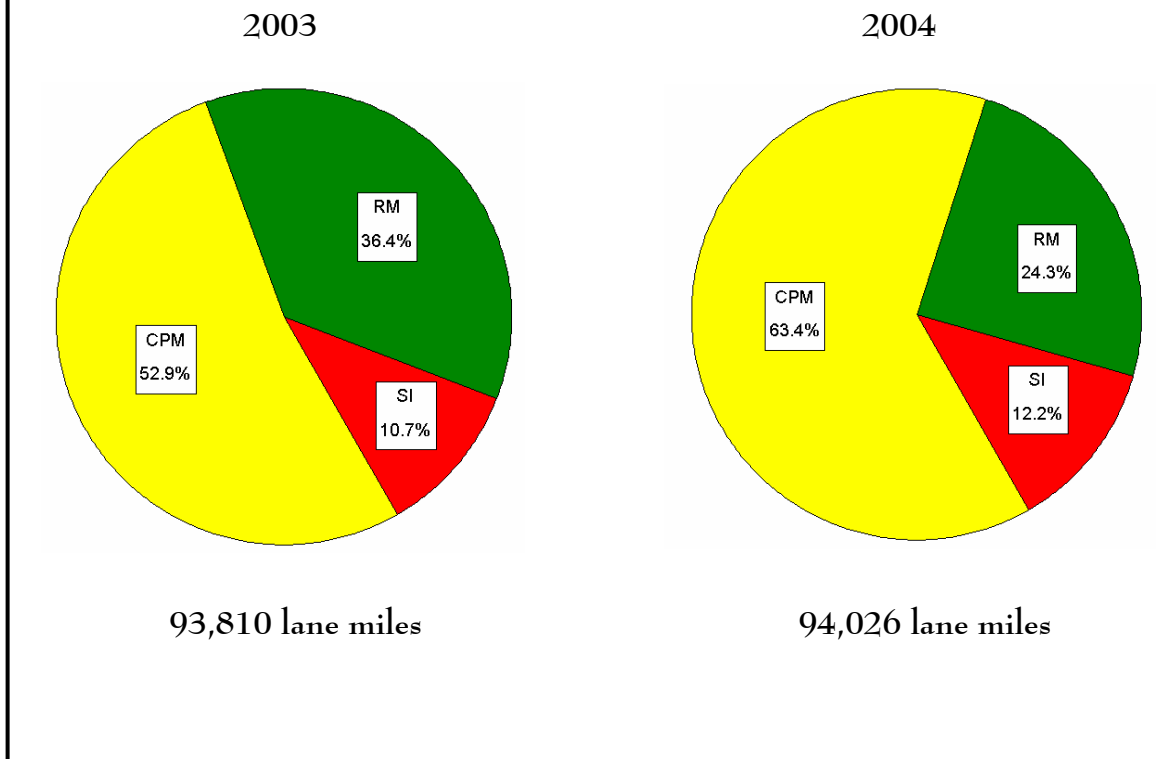
## 2004 Ratings

94,026 Lane Miles



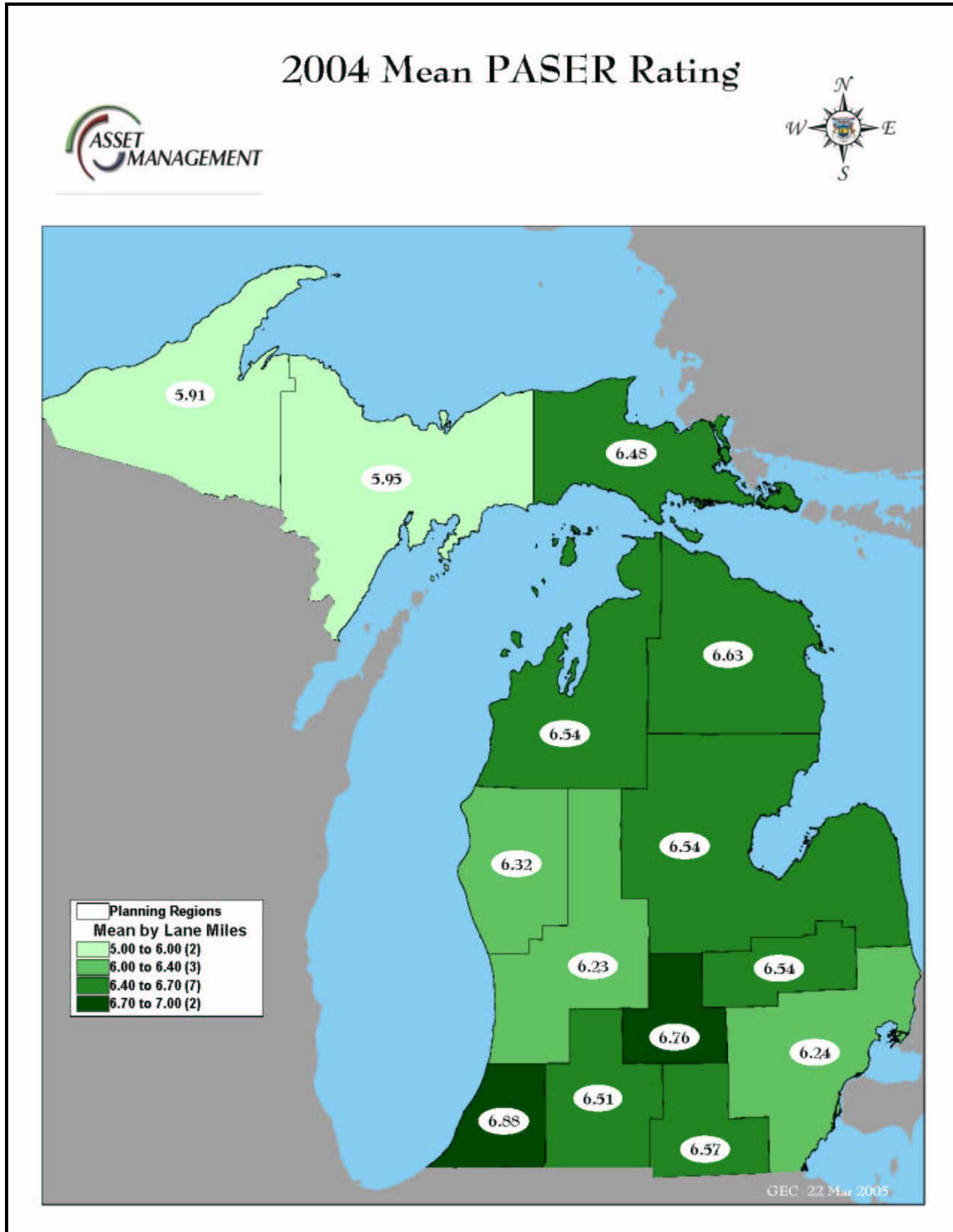


## Group Ratings by lane miles



These pie charts show the change in condition from 2003 to 2004. RM stands for routine maintenance; CPM stands for capital preventive maintenance; and SI stands for structural improvement.

The following map shows the mean PASER ratings by regional planning agency.



## NATIONAL FUNCTIONAL CLASSIFICATION

	ROUTINE MAINTENANCE		PREVENTIVE MAINTENANCE		STRUCTURAL IMPROVEMENT		TOTAL	
	Lane Miles	Percent	Lane Miles	Percent	Lane Miles	Percent	Lane Miles	Percent
<b>Freeway</b>	3,213.03	3.42%	6,122.22	6.51%	646.01	0.69%	9,981.26	10.62%
Urban	1,687.11	1.79%	3,695.77	3.93%	354.82	0.38%	5,737.70	6.10%
Rural	1,525.92	1.62%	2,426.45	2.58%	291.19	0.31%	4,243.56	4.51%
<b>Non-Freeway</b>	7,987.32	8.49%	21,495.75	22.86%	2,580.03	2.74%	32,063.10	34.10%
Urban	3,750.15	3.99%	13,584.67	14.45%	1,796.97	1.91%	19,131.79	20.35%
Rural	4,237.17	4.51%	7,911.08	8.41%	783.06	0.83%	12,931.31	13.75%
<b>ARTERIALS</b>	11,200.35	11.91%	27,617.97	29.37%	3,226.04	3.43%	42,044.36	44.72%
Urban	1,584.27	1.68%	5,709.27	6.07%	1,026.76	1.09%	8,320.30	8.85%
Rural	10,092.91	10.73%	26,321.54	27.99%	7,246.39	7.71%	43,660.84	46.44%
<b>COLLECTORS</b>	11,677.18	12.42%	32,030.81	34.07%	8,273.15	8.80%	51,981.14	55.28%
<b>TOTAL</b>	22,877.53	24.33%	59,648.78	63.44%	11,499.19	12.23%	94,025.50	100.00%

# 2003-2004 PASER RATINGS

